

Appl. No. 09/974,511
Amdt dated: August 5, 2003
Reply to Office Action of March 6, 2003

REMARKS/ARGUMENTS

Claim 24 was amended to include the features of claim 42.
Claim 48 was amended to respond to a 35 USC 112 rejection in the final rejection.

With respect to 37 CFR 1.116, entry of this Amendment is respectfully requested, since the amendments to claim 24 involve subject matter that was included in the claims prior to the final rejection and the amendment to claim 48 is to reply to a 35 USC 112 rejection that was first introduced in the final rejection.

Claims 24 and 48 were rejected under 35 USC 112, second paragraph, for the reasons set forth in the last paragraph on page 5 and the first two paragraphs on page 6 of the Office Action.

Claims 24 and 48 were amended to avoid the 35 USC 112, second paragraph rejection. The amendment to claim 48 is supported on pages 61 to 64 of the specification.

It is respectfully submitted that the present claims comply with all the requirements of 35 USC 112.

Claims 24 to 27, 38 and 41 to 48 were rejected under 35 USC 103 as being unpatentable over Satchell, Jr. (USP 5,938,815) for the reasons set forth on pages 2 and 3 of the Office Action.

It was admitted in the Office Action that Satchell, Jr. does not explicitly disclose (i) that the high-purity oxygen feed 14 may be a gas containing 20% or more of oxygen and (ii) devolatilizing the carbonaceous material until a volatile content of less than 10% is achieved.

USP 5,938,815 discloses that an iron ore feed, a carbon containing substance, and an oxygen containing gas are fed in a secondary reactor to produce products. The secondary reactor is a fluidized bed reactor, an internal circulating fluidized bed reactor, an internal circulating fluidized bed reactor, or a circulating flow reactor, as recited in claim 7 of Satchell, Jr.

In the presently claimed invention, a carbonaceous material and an ore are charged into a reacting furnace for directly contacting the carbonaceous material and oxide or hydroxide ores. The atmosphere around the ores is affected by the influence of the carbonaceous material. The ore is reduced until at least a part of the ore is metallized, and the carbonaceous material is devolatilized until a volatile content of the carbonaceous material is less than 10%. The reduction and devolatilization are carried out in the condition of the carbonaceous material and the ore being in contact with each other. In contrast to the present invention, Satchell, Jr. USP 5,938,815 employs a

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fluidized bed reactor in which the carbonaceous material and the ore are not in contact with each other. The atmosphere around the ores in Satchell, Jr. is not affected by the influence of the carbonaceous materials.

Therefore, it is respectfully submitted that the present claimed invention is quite different from Satchell, Jr. USP 5,938,815 regarding the pre-reduction furnace and the pre-reduction method.

Claims 27 and 39 were rejected under 35 USC as being unpatentable over Satchell, Jr. and further in view of JP 6-271919 for the reasons set forth in the last paragraph on page 3 of the Office Action.

Satchell, Jr. was discussed above.

It was admitted in the Office Action that Satchell, Jr. does not disclose a rotary kiln as a secondary reactor for reducing iron ore.

JP 6-271919 discloses a method for pre-treating coal and ore in a smelting reduction furnace, the method consisting of a first process for preheating the powdery ore at 500-900 °C and a second process for heating in horizontal furnace up to 900 °C by adding the coal to the preheated ore.

The present invention employs a single reacting furnace. A carbonaceous material and an ore are charged into the reacting furnace. Applicants' step (b) of reducing the ore and devolatilizing the carbonaceous material comprises reducing the ore and devolatilizing the carbonaceous material at a temperature of at least 950°C in the reacting furnace. The reduction temperature of the present claimed invention is substantially different from that of JP 6-271919.

Claims 27 and 40 were rejected under 35 USC 103 as being unpatentable over Satchell, Jr. and further in view of Kundrat (USP 5,567,224) for the reasons set forth in the first two paragraphs on page 4 of the Office Action.

It is respectfully submitted that the above discussion of Satchell, Jr. demonstrates that the presently claimed invention is patentable over Satchell, Jr. alone, or combined with any of the cited references, such as Kundrat.

Claims 24 to 27 and 38 to 48 were rejected under 35 USC 103 as being unpatentable over Meissner et al. USP 5,730,775 in view of Kaneko et al. USP 4,701,214 and Sarma et al. USP 6,171,364 for the reasons set forth in the paragraph bridging pages 4 and 5 of the Office Action.

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It was admitted in the Office Action that Meissner et al. do not explicitly disclose a step of devolatilizing a carbonaceous material until a devolatilized carbonaceous material having a volatile content of less than 10% is obtained.

It was also admitted in the Office Action that Meissner et al. do not explicitly discuss a step of controlling a post combustion rate within a smelting furnace as recited in applicants' claim 48.

According to Kaneko et al. USP 5,730,775, finely divided carbonaceous material is introduced into a vessel beneath the surface of a bath in a smelting reduction furnace. Kaneko et al. do not teach charging devolatilized carbonaceous material into a smelting furnace having a metal bath.

Even assuming arguendo that the references are combinable, if Meissner et al. USP 5,730,775 is combined with Kaneko et al. USP 4,701,214 and Sarma et al. USP 6,171,364, such combination would teach to charge devolatilized carbonaceous materials into a smelting furnace having a metal bath.

Regarding the second paragraph of page 4 of the Office Action, it is respectfully submitted that the desired results of the presently claimed invention, wherein the post combustion ratio can be operated at 40% to approximately 80% without so much

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inviting of heat loss, and it is possible to lower the net unit of coal, the net unit of oxygen and the cost of equipment, are inherent features which do not have to be recited in the claims. In re Estes, 164 USPQ 519 (CCPA 1970).

It is therefore respectfully submitted that applicants' claimed invention is not rendered obvious over the references, either singly or combined in the manner relied upon in the Office Action in view of the distinctions discussed hereinabove. It is furthermore submitted that there are no teachings in the references to combine them in the manner relied upon in the Office Action.

Reconsideration is requested. Allowance is solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

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Respectfully submitted,



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Enc.: PETITION FOR EXTENSION OF TIME